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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/955,278	09/11/2001	John S. Wang	BEAR-P020	8686

7590 12/13/2005

WAGNER, MURABITO & HAO LLP
TWO NORTH MARKET STREET
THIRD FLOOR
SAN JOSE, CA 95113

EXAMINER	
MEEK, JACOB M	

ART UNIT	PAPER NUMBER
2637	

DATE MAILED: 12/13/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/955,278	WANG ET AL.	
	Examiner	Art Unit	
	Jacob Meek	2637	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 October 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1 - 67* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1 - 67* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *11 September 2001* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 10/21/2005 has been entered.

Response to Arguments

2. Replacement drawings for figure 1, 2a and 2b were not received with amendment and therefore are still objected to.

3. Applicant's arguments with respect to claims 1 - 67 have been considered but are moot in view of the new ground(s) of rejection.

4. Examiner further notes that the amendment to the independent claims appears to recite the underlying purpose of adaptive equalization, which is to minimize ISI, which in turn maximizes the eye pattern opening.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

1. Claims 1 - 3, 5 – 7, 12 – 14, 16, 18, 19, 24 - 32, 35 – 44, 46 – 48, 53 – 55, 57, 59, 60, and 65 - 67 are rejected under 35 U.S.C. 103(a) as being unpatentable over Everitt et al ('645) in view of Qureshi (previously cited).

With regard to claim 1, Everitt discloses an adaptive equalizer device compromising; one or more controllable analog filters (see Figure 3, 310 and column 2, lines 60 – 61) compromising; one or more data inputs (see Figure 3, 302 and column 4, lines 39 – 43), one or more control signal inputs (see Figure 3, 364 and column 5, lines 1 – 2), and one or more outputs for carrying filtered output signals (see Figure 3, 312), and one or more error generators (see Figure 3, 330) for assessing the performance (see figure 3, 340 and column 4, lines 48 – 54) of one or more controllable analog filters according to one or more error functions (see column 5, lines 22 – 27) coupled to one or more analog filters compromising; one or more inputs for receiving filtered data signals (see Figure 3, 312, 330) from controllable analog filter, wherein a weighting function is applied to a filtered output signal received from controllable analog filter (see column 1, line 62 – column 2, line 14); and one or more outputs for carrying error generator output data signals (see Figure 3, 332). Everitt is silent with respect to the weighting of signal to maximize eye opening. Everitt discloses that adaptive equalizers are used to remedy ISI (see column 2, lines 6 – 9), of which the eye pattern is a qualitative measure thereof. Qureshi discloses that adaptive equalization is intended to deal with ISI (see page 1349, section I, Introduction, 4th paragraph, final sentence and page 1352, section I.A., Intersymbol Interference, 5th and 6th paragraphs (last two paragraphs in section)) of which eye pattern is a known qualitative measurement of equalization effectiveness. It would have been obvious to one of ordinary skill in the art at the

time of invention to maximize eye opening of eye pattern in order to minimize ISI (see Qureshi, page 1352, section I.A., Intersymbol Interference, last paragraph).

With regard to claim 2, Everitt teaches an adaptive equalizer compromising one or more processing modules (see figure 3, 340) for processing error generator output data signals (see figure 3, 332).

With regard to claim 3, Everitt teaches an equalizer device where processing module compromise one or more acquisition blocks (see figure 3, 340, 350) for applying one or more acquisition filters (see column 4, lines 47 – 57 where this is interpreted as equivalent) to one or more of error output signals (see column 4, lines 47 – 57 where this is interpreted as equivalent) creating one or more processed signals (see figure 3, 362, 364, 370 where these are interpreted as equivalent) compromising one or more inputs (see figure 3, 332) for receiving error output signals and one or more outputs for carrying processed data signals (see Figure 3, 362, 364, 370).

With regard to claim 5, Everitt teaches an equalizer device compromising one or more equalizer controllers (see Figure 3, 340 where this is interpreted as being equivalent) for controlling one or more controllable analog filters (see Figure 3, 310) according to one or more algorithms (see figure 3, 340 where an algorithm is an inherent part of calculation function) compromising one or more inputs for receiving equalizer controller input signals (see figure 3, 332, 360) and one or more outputs for carrying control signals coupled to one or more of control signal inputs (see Figure 3, 362, 364, 372).

With regard to claim 6, Everitt teaches an equalizer device wherein equalizer controller input data signals compromise processed data signals (see Figure 3, Output to 350, 360) or error generator output data signal (see figure 3, 332).

With regard to claim 7, Everitt teaches an equalizer device wherein the controllable analog filter compromises a digital, analog, or hybrid device (see column 5, line 8 – 10).

With regard to claim 12, Everitt teaches an adaptive equalizer wherein one or more the data signal inputs comprise analog, sampled analog input or digital input (see figure 3, input and column 1, lines 23 – 27).

With regard to claim 13, Everitt teaches an equalizer device wherein one or more of control signal inputs compromise analog or digital inputs (see column 4, lines 51 – 57).

With regard to claim 14, Everitt teaches an adaptive equalizer wherein equalizer controller compromises one or more processing units, microprocessors, SW modules, FW modules, or digital devices (see Figure 3, 340, where calculator could be interpreted a being any of those means).

With regard to claim 16, Everitt teaches an adaptive equalizer wherein equalizer controller compromises one or more external control signal outputs (see figure 3, 370,364,362 where these are interpreted as external control outputs).

With regard to claim 18, Everitt teaches an adaptive equalizer wherein equalizer controller compromises one or more external control signal inputs (see figure 3, 332,360 where these are interpreted as external control inputs).

With regard to claim 19, Everitt teaches an equalizer device wherein the controllable analog filter compromises one or more data signal outputs (see figure 3, 312).

With regard to claim 24, Everitt teaches an adaptive equalizer wherein error generator compromises a weighting function (see figure 3, 330 where this is interpreted as equivalent).

With regard to claim 25, Everitt teaches an adaptive equalizer further comprising one or more modules comprising a capacity reporting module, device status module, link monitor or

monitoring module (see column 5, lines 21 – 34 where this is interpreted as equivalent functionality).

With regard to claim 26, Everitt teaches an adaptive equalizer further compromising one or more modules compromising a receiver gain module (figure 3, 304), a decision threshold level module (figure 3, 314), DC offset module (see figure 3, 380).

With regard to claims 27, 28, 30, 31, 32, 35, 36 the steps claimed as method is nothing more than restating the function of the specific components of the device as claimed above and therefore it would have been obvious considering the aforementioned rejection for the device of claim 1, 19, 24, 2, 3, 5, 6 respectively.

With regard to claim 29, Everitt teaches a level shift function (see Figure 3, 370, 372, 380 where this is interpreted as a level shift function).

With regard to claim 37, Everitt teaches a method for executing joint optimization of one or more external devices (column 4, lines 51 – 57).

With regard to claim 38, Everitt teaches a method further compromising the step of assessing capacity, device status or link monitor status based on filter coefficients (see Figure 3, 340 and column 4, lines 47 – 48 where calculator performs assessment function which is interpreted as equivalent functionality).

With regard to claim 39, Everitt teaches a method further compromising the step of reporting capacity, device status or link monitor status based on filter coefficients (see Figure 3, 350,360 and column 4, lines 48 – 54 where FIFO performs reports history status which is interpreted as equivalent functionality).

With regard to claim 40, Everitt teaches a method of operating iteratively (see column 4, lines 58 – 64 where convergence is interpreted as an iterative process).

With regard to claim 41, Everitt teaches a method of adapting a filter based on sampled values of outputs. The operation of this device makes an initial setting of the filter inherent in order for operation to occur, as a starting point must be established for operation to occur.

With regard to claims 42 - 44, 46 – 48, 53 – 55, 57, 59, 60, 65 - 67 Everitt teaches an optical networking system (see column 1, lines 22 – 26 where this is interpreted as inclusive of optical networking systems) compromising an adaptive equalizer device with additional limitations analyzed as identical to limitations in claim 1 – 3, 5 – 7, 12 – 14, 16, 18, 24 - 26 respectively.

2. Claims 1 - 4, 9, 10, 15, 17, 20 – 23, 27, 31 – 34, 42 - 45, 50, 51, 56, 58 and 61 - 64 are rejected under 35 U.S.C. 103(a) as being unpatentable over Buchwald et al (US Pub 2002/0034222 A1) in view of Qureshi (previously cited).

With regard to claim 1, Buchwald teaches an adaptive equalizer device compromising; one or more controllable analog filters (see Figure 19, 1400 and paragraphs 0129 and 0130) compromising; one or more data inputs (see Figure 19, 102 and paragraphs 0007 and 0008), one or more control signal inputs (paragraph 0115), and one or more outputs for carrying filtered output signals (see Figure 19, 1400 to 202), and one or more error generators (see paragraph 0115 where this is interpreted as equivalent functionality) for assessing the performance (see paragraph 0116) of one or more controllable analog filters according to one or more error functions (see paragraph 0117) coupled to one or more analog filters compromising; one or more inputs for receiving filtered data signals (see Figure 19, 1902) from controllable analog filter, wherein a weighting function is applied to a filtered output signal received from controllable analog filter (see paragraph 0147 where this is interpreted as equivalent functionality); and one or more outputs for carrying error generator output data

signals (see Figure 19, 1912). Buchwald is silent with respect to the weighting of signal to maximize eye opening. Buchwald discloses adaptive equalizer is used to minimize ISI and open eye of received analog data signal (see paragraph 0069). Qureshi discloses that adaptive equalization is intended to deal with ISI (see page 1349, section I, Introduction, 4th paragraph, final sentence and page 1352, section I.A., Intersymbol Interference, 5th and 6th paragraphs (last two paragraphs in section)) of which eye pattern is a known qualitative measurement of equalization effectiveness. It would have been obvious to one of ordinary skill in the art at the time of invention to maximize eye opening of eye pattern in order to minimize ISI (see Qureshi, page 1352, section I.A., Intersymbol Interference, last paragraph).

With regard to claim 2, Buchwald teaches an adaptive equalizer compromising one or more processing modules (see page 3, paragraph 0087) for processing error generator output data signals (see page 5, paragraph 0115 where this is interpreted as equivalent).

With regard to claim 3, Buchwald teaches an equalizer device where processing module compromise one or more acquisition blocks for applying one or more acquisition filters (see page 5, paragraphs 0115, 0116 where this is interpreted as equivalent) to one or more of error output signals creating one or more processed signals (see page 5, paragraphs 0117 where this is interpreted as equivalent) compromising one or more inputs (see figure 3, 332) for receiving error output signals and one or more outputs for carrying processed data signals (see page 5, paragraphs 0117 where this is interpreted as equivalent).

With regard to claim 4, Buchwald teaches an equalizer device for minimizing distortion. Buchwald is silent with respect to the specific filter to be used for equalization (see page 3, paragraph 0079). The type of filter used would be a design choice and based on Buchwald's discussion of problem to be solved (see page 1, paragraph 0005) the selection of the type of filter to be used would be a design choice.

With regard to claim 9, Buchwald teaches an adaptive equalizer wherein one or more algorithms may be added, updated, activated, decommissioned, or deleted (see paragraphs 0087, 0147, 0159 where this description of system is interpreted as inclusive of functions claimed).

With regard to claim 10, Buchwald teaches an adaptive equalizer wherein one or more error functions may be added, updated, activated, decommissioned, or deleted (see paragraphs 0087, 0147, 0159 where this description of system is interpreted as inclusive of functions claimed).

With regard to claim 15, Buchwald teaches an adaptive equalizer wherein equalizer controller comprises one or more external data outputs (see paragraph 0145 where this is interpreted as equivalent).

With regard to claim 17, Buchwald teaches an adaptive equalizer wherein equalizer controller comprises one or more external data inputs (see paragraph 0147 where this is interpreted as equivalent).

With regard to claim 20, Buchwald teaches an adaptive equalizer wherein equalizer controller comprises one or more error generators compromise on or more external data outputs (see paragraph 0158 where this is interpreted as equivalent).

With regard to claim 21, Buchwald teaches a method of monitoring eye patterns (see paragraph 0069 and 0115 where this is interpreted as inclusive of error monitoring).

With regard to claim 22, Buchwald teaches an adaptive equalizer where one or more of said error generators compromise a clock or clock recovery system (see paragraph 0091 where clock control is interpreted as equivalent functionality).

With regard to claim 23, Buchwald teaches an adaptive equalizer wherein one or more of error generators are coupled to clock or clock recovery device (see paragraph 0091 where error generators are interpreted as connected to clock module).

With regard to claims 27, 31, 32, 33 the steps claimed as method is nothing more than restating the function of the specific components of the device as claimed above and therefore it would have been obvious considering the aforementioned rejection for the device of claims 1 - 4 respectively.

With regard to claim 34, Buchwald teaches a method of digitizing error generator output signals (see page 5, paragraphs 0115, 0116 where this is interpreted as equivalent).

With regard to claims 42 -45, 50, 51, 56, 58, and 61 -64 Buchwald teaches an optical networking system (see Figure 1, 100 where this is interpreted as inclusive of optical networking systems) compromising an adaptive equalizer device with additional limitations analyzed as identical to limitations in claims 1 - 4, 9, 10, 15, 17 and 21 - 23 respectively.

3. Claims 8, and 49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Buchwald et al (US Pub 2002/0034222 A1) in view of Qureshi (Proceedings of the IEEE; Volume: 73 Issue: 9 Date: Sept. 1985; Adaptive equalization; Qureshi, S.U.H.; Page(s): 1349-1387) in further view of Glentis et al (Efficient least squares adaptive algorithms for FIR transversal filtering; Glentis, G.-O., etal; Signal Processing Magazine, IEEE , Volume: 16 , Issue: 4 , July 1999 Pages:13 - 41).

With regard to claim 8, Buchwald teaches an adaptive equalizer device wherein LMS algorithms are used (see paragraph 0148) and that his device is not limited to LMS embodiments (paragraph 0150). Glentis teaches a wide variety of equalization techniques including quasi-Newton (see page 14, 1st column 3rd paragraph) and steepest descent (see page 14, 1st column, 5th paragraph). It would have been obvious to one of ordinary skill of the

art at the time of invention that a variety of algorithms could be used in Buchwald's device in view of his disclosure of paragraph 0147 that a variety of algorithms could be used.

With regard to claim 49, Buchwald teaches an optical networking system (see Figure 1, 100 where this is interpreted as inclusive of optical networking systems) compromising an adaptive equalizer device with additional limitations analyzed as identical to limitations in claim 8.

4. Claims 11, and 52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Buchwald et al (US Pub 2002/0034222 A1) in view of Qureshi (Proceedings of the IEEE; Volume: 73 Issue: 9 Date: Sept. 1985; Adaptive equalization; Qureshi, S.U.H.; Page(s): 1349-1387) in further view of Glentis et al (Fast adaptive algorithms for multichannel filtering and system identification; Glentis, G.-O.A., et al; Signal Processing, IEEE Transactions on , Volume: 40 Issue 10 , Oct. 1992 Pages: 2433 - 2458).

With regard to claim 11, Buchwald teaches an adaptive equalizer device wherein analog filters are used (see paragraph 0129) and that his device is can be implemented in a variety of ways. Glentis teaches a wide variety of equalization techniques and that filter structure is dictated by equalization algorithm (see page 2439, section IV and V where lattice and transversal equalization / filtering techniques are discussed). It would have been obvious to one of ordinary skill of the art at the time of invention that a variety of algorithms could be used in Buchwald's device in view of his disclosure of paragraph 0147 that a variety of algorithms could be used.

With regard to claim 52, Buchwald teaches an optical networking system (see Figure 1, 100 where this is interpreted as inclusive of optical networking systems) compromising an

adaptive equalizer device with additional limitations analyzed as identical to limitations in claim 11.

Other Cited Prior Art

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

De Jager et al (US-3,845,390) discloses an adaptive equalizer for the shaping of eye pattern.

Ding et al (On the admissibility of blind adaptive equalizers) discloses the need for equalizers to an open eye pattern.

Macchi et al (Convergence analysis of self-adaptive equalizers) discusses convergence of equalizers to open eye patterns.

Ungerboeck (Nonlinear Equalization of Binary Signals in Gaussian Noise) discloses relationship of equalization and eye pattern.

Dualibe et al (Embedded fuzzy control for automatic channel equalization after digital transmissions) discloses equalization resulting in an open eye pattern.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jacob Meek whose telephone number is (571)272-3013. The examiner can normally be reached on 8:00 - 4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jay Patel can be reached on (571)272-2988. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JMM
12/7/05